

REMARKS

In view of the foregoing amendments and remarks that follow, reconsideration and allowance of this application are respectfully requested.

Claims 1, 4, 7 and 9 have been amended. Claims 3 and 8 have been cancelled. Claims 12 and 13 have been added.

Claims 1, 4, and 11 were rejected under 35 U.S.C. 102(b) as being anticipated by Lee et al. (US Pat. 6,054,338) ("Lee"). Claims 3 and 8 were rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Fujiwara et al. (JP 2003-17829) ("Fujiwara").

Independent claim 1 has been amended to recite:

"wherein the third step is performed in a state in which a buffer member is located on the surface of the large ceramic substrate to which the conductive balls are fixed, the buffer member having a concave portion to house the conductive balls and a convex portion in contact with the surface of the substrate and/or the circuit element and by doing so, all stress to be applied in the third step is applied to the substrate and/or the circuit element."

Support for the amendment to claim 1 is presented in now-cancelled claim 3. These features as recited in claim 1 enable the substrate to be divided along the division grooves without applying stress or vibrations directly onto the conductive balls themselves, thus minimizing or eliminating flaking (or peeling) between the substrate and the conductive balls, as discussed in paragraph 0041 of the present application.

It is submitted that neither Lee nor Fujiwara, nor the combination thereof, discloses or suggests the features recited in claim 1 as amended. Specifically, neither of these cited references discloses applying or using a buffer member that has a convex portion that is in contact with the surface of the substrate during the step in which the substrate is divided (i.e., the third step) as well as a concave portion that is positioned above the conductive balls on the

surface of the substrate. Still further, neither cited reference discloses utilizing a buffer member that causes all the stress to be applied to the substrate and/or the circuit elements, or in other words that causes no stress on the conductive balls.

Lee discloses separating individual circuits located on a substrate 20 by breaking substrate 20 along V-grooves 22, which divide substrate 20 into multiple segments 24 of substantially the same size, each segment 24 containing an integrated circuit 28 on one surface of substrate 20 and multiple solder balls 30 on the opposite surface. Lee, however, is silent as to how the substrate is actually separated into individual circuits and, more particularly, has no discussion or teaching regarding applying stress through a buffer member to separate the individual circuits.

Fujiwara discloses a flat buffer material 7 lining the inside walls of a cutting jig 1, the material enveloping the entire wiring board 9 and the conductive bumps 10 position on that board when it is sandwiched between an upper section 2 and a lower section 3 of cutting jig 1. However, in contrast to the buffer member disclosed in the present application and as recited in claim 1 of the present application, the buffer material employed in Fujiwara is flat and, thus, does not contain either a concave portion or a convex portion. Still further, the design disclosed in Fujiwara results in the application of stress on the conductive balls since the buffer material contacts the conductive balls. Hence, Fujiwara does not disclose various features of the present invention as recited in claim 1.

In view of the foregoing, claim 1 is not anticipated by Lee. Moreover, claim 1 is patentably distinct and unobvious over the combination of Lee and Fujiwara. It is therefore requested that the rejection of claim 1, as well as claims 4 and 11 dependent thereon, be withdrawn.

Claims 7 and 9 were rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Masumoto et al. (JP 2001053033) ("Masumoto"). Claim 7 has been amended in a manner similar to the amendment to claim 1, and support for such amendment is provided in now-cancelled claim 8.

As previously addressed, Lee neither discloses nor suggests various features recited in claim 7. Masumoto also does not disclose such features. In particular, Masumoto forms dicing grooves on the main surface of a semiconductor wafer containing electronic circuits, fills in the grooves, covers the conductive balls (that are located on the rear surface of the semiconductor wafer) with a resin, and then cuts the semiconductor wafer along the grooves in order to separate the electronic circuits. However, Masumoto neither discloses nor suggests employing a buffer member that has a concave portion that houses the conductive balls and that has a convex portion that is in contact with the semiconductor wafer. In addition, by covering the conductive balls with a resin, the subsequent cutting of the semiconductor wafer inherently results in the application of stress on the conductive balls. Hence, Masumoto neither discloses nor suggests various features of the present invention as now recited in claim 7.

In view of the foregoing, claim 7 is patentably distinct and unobvious over the combination of Lee and Masumoto. It is therefore requested that the rejection of claim 7, as well as claim 9 dependent thereon, be withdrawn.

Claims 6 and 10 were rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view Robaato (JP 10050886 A). Since claims 6 and 10 depend from independent claims 1 and 7, respectively, and since Robaato does not disclose the aforementioned features recited in claims 1 and 7, and missing from Lee, claims 6 and 10 are patentably distinct and unobvious over the

combination of Lee and Robaato. It is therefore requested that the rejection of claims 6 and 10 be withdrawn.

New claims 12 and 13 depend from claims 1 and 7, respectively, and recite that the concave portion of the buffer member does not come into contact with the conductive balls. Support for this feature can be found at least in Fig. 2 of the Drawings. None of the cited references discloses a buffer member that does not come into contact with the conductive balls. The allowance of new claims 12 and 13 therefore is solicited.

In light of the foregoing amendments and remarks, reconsideration and allowance of this application are respectfully requested.

Respectfully submitted,

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